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4743 7590 07/07/2010

MARSHALL, GERSTEIN & BORUN LLP
233 SOUTH WACKER DRIVE
6300 WILLIS TOWER
CHICAGO, IL 60606-6357

EXAMINER

MANDIEVILLE, JASON M

ART UNIT

PAPER NUMBER

2629

DATE MAILED: 07/07/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,182	06/20/2005	Paul R Routley	30740/285902	3530

TITLE OF INVENTION: DISPLAY DRIVER CIRCUITS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	10/07/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail Stop ISSUE FEE**
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INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

4743 7590 07/07/2010
MARSHALL, GERSTEIN & BORUN LLP
233 SOUTH WACKER DRIVE
6300 WILLIS TOWER
CHICAGO, IL 60606-6357

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or by facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/518,182	06/20/2005	Paul R Routley	30740/285902	3530
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TITLE OF INVENTION: DISPLAY DRIVER CIRCUITS

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nonprovisional	NO	\$1510	\$300	\$0	\$1810	10/07/2010
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EXAMINER	ART UNIT	CLASS-SUBCLASS
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MANDEVILLE, JASON M	2629	345-211000
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1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys

1 _____

or agents OR, alternatively,

2 _____

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is

3 _____

listed, no name will be printed.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): Individual Corporation or other private group entity Government

4a. The following fee(s) are submitted:

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

Issue Fee
 Publication Fee (No small entity discount permitted)
 Advance Order - # of Copies _____

A check is enclosed.
 Payment by credit card. Form PTO-2038 is attached.
 The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS; SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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4743	7590	07/07/2010		EXAMINER
MARSHALL, GERSTEIN & BORUN LLP 233 SOUTH WACKER DRIVE 6300 WILLIS TOWER CHICAGO, IL 60606-6357				MANDEVILLE, JASON M
			ART UNIT	PAPER NUMBER
			2629	
DATE MAILED: 07/07/2010				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No.	Applicant(s)	
	10/518,182	ROUTLEY ET AL.	
	Examiner	Art Unit	
	JASON M. MANDEVILLE	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTO-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. This communication is responsive to 19 April 2010.

2. The allowed claim(s) is/are Claims 1, 4, 7, 13, 14, 17, 23, 27, 28, and 31 (now renumbered Claims 1-10).

3. Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some* c) None of the:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. ____.

3. Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

(a) including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached 1) hereto or 2) to Paper No./Mail Date ____.

(b) including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. Notice of References Cited (PTO-892)

5. Notice of Informal Patent Application

2. Notice of Draftsperson's Patent Drawing Review (PTO-948)

6. Interview Summary (PTO-413),
Paper No./Mail Date ____.

3. Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date ____.

7. Examiner's Amendment/Comment

4. Examiner's Comment Regarding Requirement for Deposit
of Biological Material

8. Examiner's Statement of Reasons for Allowance

9. Other ____.

EXAMINER'S AMENDMENT

Specification

1. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Paul B. Stephens on 01 July 2010.

3. The application has been amended as follows:

4. Amended **Claim 1** now reads:

1. A display driver for an active matrix electroluminescent display, the display comprising a plurality of electroluminescent pixels each pixel comprising a pixel driver circuit and a display element, each said pixel driver circuit including a drive field effect transistor having a gate connection for driving the associated display element in accordance with a voltage on the gate connection to produce a driving current through said display element, the display driver comprising:

 a display element brightness controller configured to provide an output to drive a said gate connection to control the electroluminescent output from a said pixel;
 a voltage sensor to sense a said voltage on said gate connection; and

a power controller coupled to said voltage sensor for controlling an adjustable voltage power supply to each of said plurality of electroluminescent pixels, said power controller configured to read a sensed voltage on each said pixel gate connection within a predetermined period to identify a display element having a maximum brightness relative to others of said display elements within said predetermined period, wherein said [[power controller and said]] display element brightness controller and said power controller are configured to, respectively and concurrently within a period, increase said voltage on said gate connection of said pixel having said identified display element and to reduce said power supply voltage, to a point where the voltage of said adjustable voltage power supply is just sufficient to maintain a current to said identified display element substantially equal to a predetermined current corresponding to a current that is produced in said identified display element prior to said increasing of said voltage on said gate connection and said reducing of said power supply voltage, said increasing and said reducing in response to a said sensed voltage on said gate connection of said pixel having said identified display element, wherein said increasing and said reducing are performed as long as said sensed voltage on said gate connection is determined to be less than a maximum available voltage for outputting from said brightness controller to said display element and until said voltage on said gate connection substantially reaches said maximum available voltage.

5. Amended **Claim 17** now reads:

17. A method of operating an active matrix electroluminescent display, the display comprising a plurality of electroluminescent pixels each pixel comprising an associated pixel driver and a display element, each said pixel driver including a drive field effect transistor having a gate connection for driving the associated display element in accordance with a voltage on the gate connection to produce a driving current through said display element, the display having an adjustable voltage power supply coupled to provide a power supply voltage to each of said plurality of electroluminescent pixels, and a plurality of control lines corresponding to said gate connections for setting the brightness of each pixel, the method comprising:

setting the brightness of pixels of the display using said control lines to drive said gate connections;

monitoring said control lines of the display to sense said voltages on said gate connections, and controlling said adjustable voltage power supply to each of said plurality of electroluminescent pixels by reading a sensed voltage on each said gate connection within a predetermined period to identify a display element having a maximum brightness relative to others of said display elements within said predetermined period; and

concurrently within a period, reducing said power supply voltage and increasing said voltage on said gate connection of said pixel having said identified display element, responsive to said monitoring to a point where a voltage of said adjustable voltage power supply is just sufficient [[for a]] to maintain a current to said identified display

element substantially equal to a predetermined current corresponding to a current that is produced in said identified display element prior to said increasing of said voltage on said gate connection and said reducing of said power supply voltage, said increasing and said reducing in response to a said sensed voltage on said gate connection of said pixel having said identified display element, wherein said increasing and said reducing are performed as long as said sensed voltage on said gate connection is determined to be less than a maximum available voltage for outputting to said display element and until said voltage on said gate connection substantially reaches said maximum available voltage.

Allowable Subject Matter

6. **Claims 1, 4, 7, 13, 14, 17, 23, 27, 28, and 31** (now renumbered **Claims 1-10**) are allowed.

7. The following is an examiner's statement of reasons for allowance: none of the references relied upon by the examiner, considered alone or in reasonable combination, teach or fairly suggest the totality of limitations recited in independent **Claims 1 and 17** (now renumbered **Claims 1 and 6**). In particular, no combination of the references relied upon by the examiner teach or fairly suggest a display driver for an active matrix electroluminescent display and associated method of driving the display comprising: a

voltage sensor to sense a voltage on a gate connection of a driving transistor of an electroluminescent display pixel and to identify a display element having maximum brightness relative to others of the display elements, and the combination of a display element brightness controller to control the drive voltage applied to the gate connection of the driving transistor and a power controller to control the power supply voltage of an adjustable power supply wherein the display element brightness controller and the power controller are configured to, respectively and concurrently within a period, increase the voltage on the gate connection of the identified display element and to reduce the power supply voltage, to a point where the voltage of the adjustable voltage power supply is just sufficient to maintain a current to the identified display element substantially equal to a predetermined current corresponding to a current that is produced in the identified display element prior to the increasing of the voltage on the gate connection and the reducing of the power supply voltage, the increasing and the reducing in response to the sensed voltage on the gate connection of the pixel having the identified display element, wherein the increasing and the reducing are performed as long as the sensed voltage on the gate connection is determined to be less than a maximum available voltage for outputting from the brightness controller to the display element and until the voltage on the gate connection substantially reaches the maximum voltage.

As pertaining to the most pertinent art relied upon by the examiner, Kimura et al. (hereinafter "Kimura" US 6,518,962) discloses a display driver (see Fig. 1, Fig. 3, and Fig. 5) for an active matrix electroluminescent display (see Abstract, Col. 1, Ln. 10-23

and Col. 23, Ln. 18-46), the display (see Fig. 1) comprising a display element brightness controller (i.e., see (12, 16, 21, 22, 23) of Fig. 3 and Fig. 5) configured to drive the gate connections (see (223 in Fig. 1)) to control the electroluminescent output (224) from the pixels (10; see Col. 20; Ln. 9-67 through Col. 21, Ln. 1-19; and see Col. 21, Ln. 29-67 through Col. 22, Ln. 1-39); and a voltage sensor (22, 23; see Fig. 3 and Fig. 5) to sense a voltage on the gate connection (i.e., to sense or determine the data voltage corresponding to the data current; again, see Col. 20; Ln. 9-67 through Col. 21, Ln. 1-19; and see Col. 21, Ln. 29-67 through Col. 22, Ln. 1-39); a power controller (23, 22, 13) coupled to the voltage sensor (22, 23) for controlling an adjustable voltage power supply (13), the power supply controller (23, 22, 13) being configured to reduce the power supply voltage (13) in response to the sensed voltage (22, 23) to a point where a voltage is just sufficient to be able to provide a highest gate connection voltage (i.e., a highest data voltage applied to (223); see Fig. 3 and Fig. 5; see Col. 20; Ln. 9-67 through Col. 21, Ln. 1-19; and see Col. 21, Ln. 29-67 through Col. 22, Ln. 1-51).

However, Kimura does not disclose the combination of a display element brightness controller to control the drive voltage applied to the gate connection of the driving transistor and a power controller to control the power supply voltage of an adjustable power supply wherein the display element brightness controller and the power controller are configured to, respectively and concurrently within a period, increase the voltage on the gate connection of the identified display element and to reduce the power supply voltage, to a point where the voltage of the adjustable voltage power supply is just sufficient to maintain a current to the identified display element

substantially equal to a predetermined current corresponding to a current that is produced in the identified display element prior to the increasing of the voltage on the gate connection and the reducing of the power supply voltage, the increasing and the reducing in response to the sensed voltage on the gate connection of the pixel having the identified display element, wherein the increasing and the reducing are performed as long as the sensed voltage on the gate connection is determined to be less than a maximum available voltage for outputting from the brightness controller to the display element and until the voltage on the gate connection substantially reaches the maximum voltage. In fact, none of the references relied upon by the examiner teach or fairly suggest this combination of features.

(The examiner has taken note of co-pending Application Number 10/518,286 attributed to the same inventors. While this application is directed, conceptually, to a similar driving function, the invention of the co-pending application is directed to a passive matrix display, while that of the current application is directed to an active matrix display. As such, the implementation of the disclosed function appears to be significantly different. These differences appear to be reflected in the differences between the claims of the co-pending application and the current application).

Therefore, **Claims 1, 4, 7, 13, 14, 17, 23, 27, 28, and 31** (now renumbered **Claims 1-10**) are allowed.

8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON M. MANDEVILLE whose telephone number is (571)270-3136. The examiner can normally be reached on Monday through Friday 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on 571-272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jason Mandeville
Examiner
Art Unit 2629

/J. M. M./
Examiner, Art Unit 2629

*/Alexander Eisen/
Supervisory Patent Examiner, Art Unit 2629*